iPhone 4 Verizon Teardown

16 or 32 GB / Model A1349

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INTRODUCTION

We got our hands on the new iPhone 4 Verizon on the morning of February 7th, 2011. Compare this phone to our original GSM iPhone 4 teardown.

If you're happy with your current coverage, then by all means hang on to it! Keep it running if you drop it or your battery wears down using our iPhone 4 repair manual and parts.

Make sure to also check out the Verizon iPhone 4 Teardown video on YouTube!

TOOLS:

- P2 Pentalobe Screwdriver iPhone (1)
- Phillips #000 Screwdriver (1)
- iFixit Opening Tools (1)
- 2.5 mm Flathead Screwdriver (1)
- Spudger (1)

Step 1 — iPhone 4 Verizon Teardown

- The iPhone 4 is finally on Verizon!
- We didn't try making a call, but we hear that this phone does make and maintain "**complete calls.**"
- On the back, Apple's removed the visual warning to not throw your iPhone 4 in the trash.

  These logos tend to relate to non US countries. The "recycling bin" logo, for example, is for the European WEEE Directive. Since the CDMA model is not sold in countries which require these symbols, they don't appear.
- Apple's updated the model number (from A1322 to A1349), but there's not much externally to let us know we're dealing with a Verizon iPhone. Is this the first Verizon phone without "Verizon" emblazoned on it?

Step 2

There are a few external differences, reflecting the different antenna design of the new CDMA iPhone.

- CDMA, or Code-Division Multiple Access, is actually just a channel access method standard. When most people (including us) say CDMA, they usually mean CDMA2000, which is a family of 3G communication standards that run on top of the CDMA mechanism of utilizing airwaves. Confused? Unless you're an RF engineer, the distinction probably doesn't matter to you.
- In the US, Sprint and Verizon use CDMA. T-Mobile and AT&T use GSM.
- Worldwide, GSM (which stands for Global System for Mobile Communication) is far more popular. But CDMA is still used in 40 countries, primarily in Asia. China Telecom is the next largest CDMA carrier, with over 90 million subscribers.

Step 3

- The SIM slot is gone. According to Apple, the SIM card and SIM tray were the only user-serviceable parts in the AT&T iPhone 4. Apple now says "iPhone does not contain any user-serviceable parts." We believe you have the right to repair your own hardware, and we'll have a repair guide available right away.
- We believe the additional break in the antenna enclosure on the right side of the phone is a result of the switch from GSM to CDMA. An antenna's operating frequency is directly dependent on its size and geometry, so the change-up required an antenna overhaul.
  - The AT&T GSM iPhone has three differently shaped antennas, which enable the phone to communicate on UMTS/HSDPA/HSUPA (850, 900, 1900, 2100 MHz) and GSM/EDGE (850, 900, 1800, 1900 MHz).
  - The CDMA iPhone, which has four antenna segments (two "U" shaped pieces at the top and bottom, and two straight bars along the edge) only needs to operate on 800 and 1900 MHz for CDMA EV-DO Rev. A.

- Both phones use 2400 MHz frequencies for Bluetooth and 2.4 GHz for WiFi and the 1.575 GHz frequency for A-GPS.

- Only time will tell if this new antenna design helps combat the reception problems reportedly plaguing AT&T's GSM iPhone 4. However, there is no reason to expect that it would as the problem reportedly does not occur with the GSM iPhone on other GSM networks around the world.

Step 4

- As expected, the iPhone came with tiny Pentalobe screws.

- We've got a couple options for you to get past these screws. We offer a Liberation Kit to replace these screws with standard Phillips screws, or a high-quality Pentalobe screwdriver (pictured).

Step 5



- After the screws are out, the back cover slides off easily.
- Unfortunately, no surprises yet...to be honest, we were kinda expecting some magical cloud of pixie dust...

Step 6

- At a quick glance, things don't look too different in here. But the fact remains, they are **not identical**. If you can't tell, the Verizon iPhone is on the **left**.
- Apple has removed the counterweighted vibrator motor in the corner of the phone and switched to a different vibrator design that's now placed near the battery connector.
- You can also see the re-located antenna notch in the second picture.

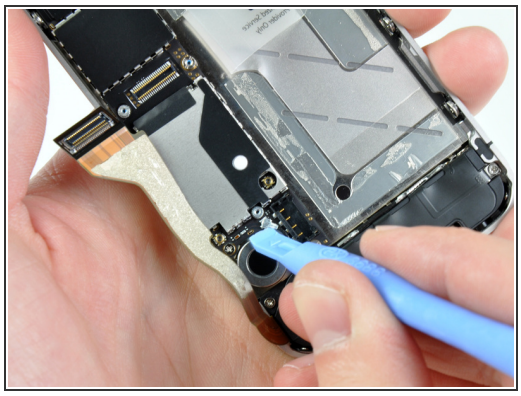
Step 7

- The back covers are very similar, but not interchangeable.
- Curious which phone you should take with you on your epic around the world journey?
- Wikipedia lists just 58 CDMA carriers in about 40 countries, and almost 300 GSM/UTMS carriers.
- If you only have room for one phone, stick with the GSM version. But, if you are desperate for more reliable coverage in the US, Verizon will provide you with a free loaner 'country compatible' phone for up to three weeks.

Step 8

- Once you're inside, the battery is very easy to replace. The battery is listed as the same 5.25 Watt-hour capacity, but does have a new model number (616-0520).
- The new battery also weighs less; it shrunk from 26.9 grams to 25.6 grams.

Step 9

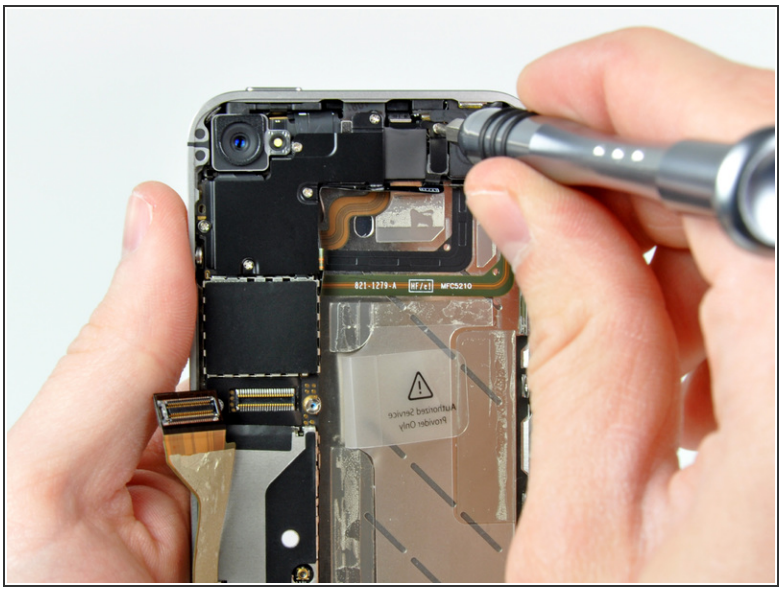

- Disconnecting the Wi-Fi antenna.

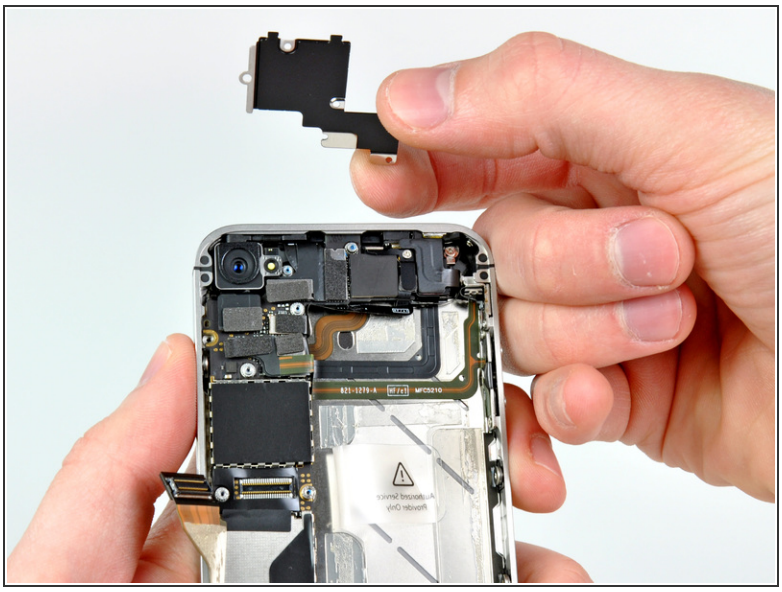
For enough room to disconnect the Wi-Fi antenna on this phone, the ground finger must first be removed. Apple moved this finger out from beneath the battery connector, making battery replacement that much easier.

The Wi-Fi antenna and chip are perhaps the only RF components of the phone that did not receive a revamp. The board utilizes a Broadcom BCM4329 - the same chip found on the GSM iPhone 4. This antenna is nearly identical to the unit found in the GSM iPhone 4.

- The speaker chamber and cellular antenna assembly come out easily enough.

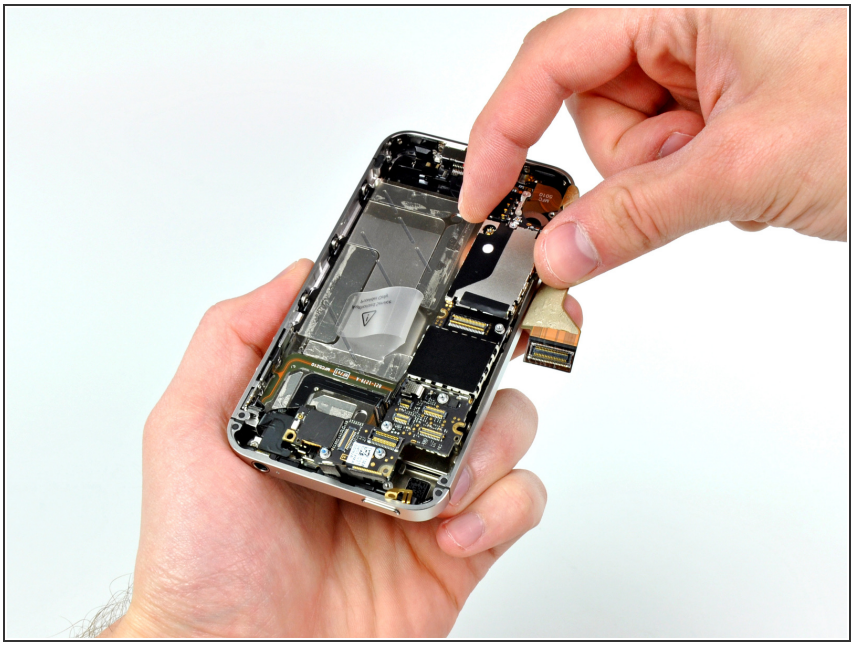
Step 10





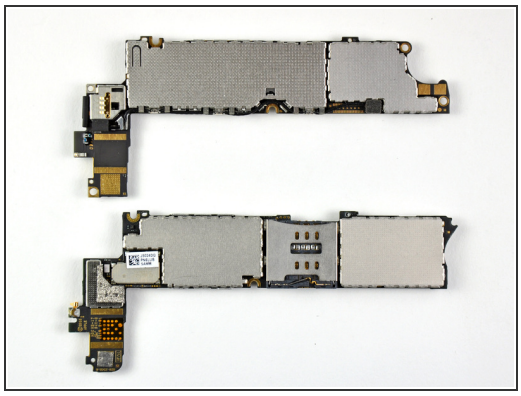
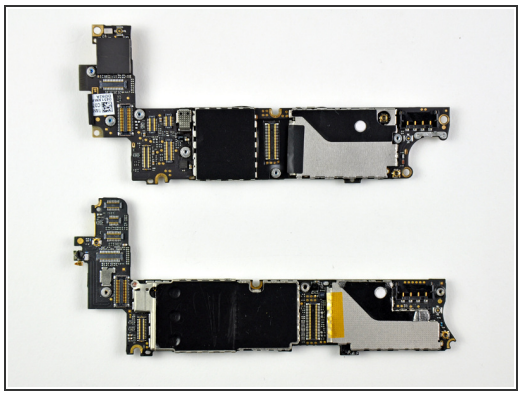
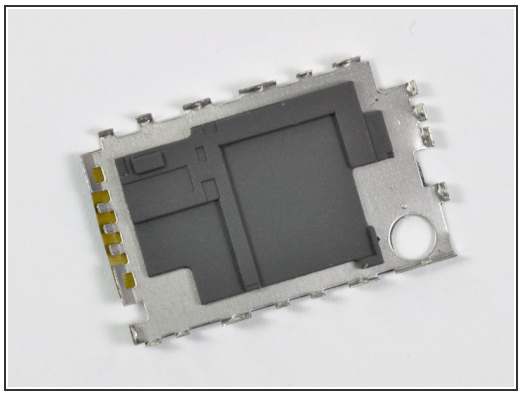
- After removing a metal shield, a sea of connectors becomes visible.
- Thankfully none of them are tricky to disconnect, so disassembly is not especially challenging. With the help of a repair guide to keep screws and pieces straight, repairing this phone shouldn't be too difficult.

Step 11



- The logic board can finally be lifted out of the iPhone.

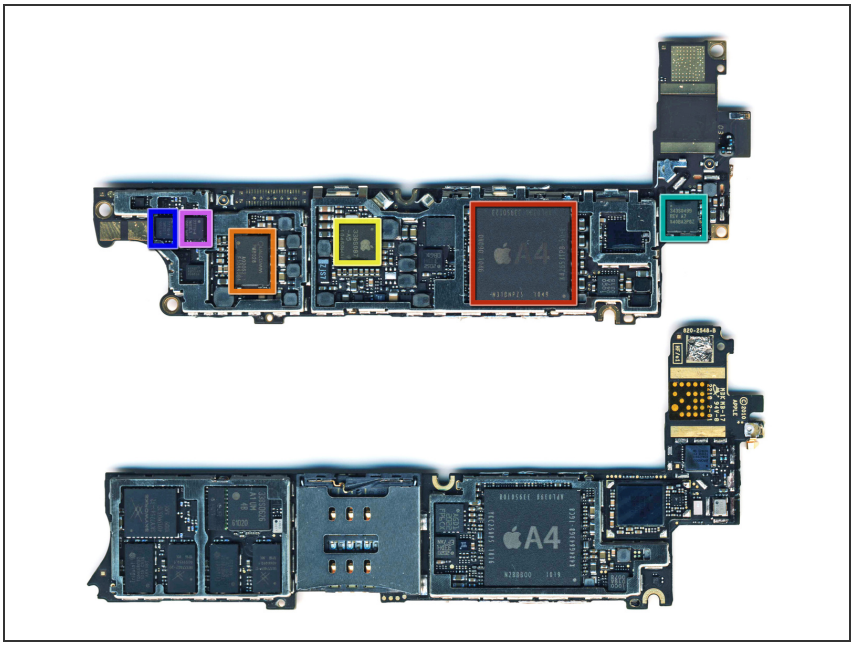
Step 12

Verizon iPhone 4 logic board on top.

- Although it's the same form factor, this is definitely not the same board. Conspicuously absent is the SIM slot. That's freed up a lot of space for something.
- We'll get the EMI shields off soon enough...
- Apple used custom molded rubber bumpers between the chips and the EMI shields presumably to quell any interference between analog and digital circuitry.

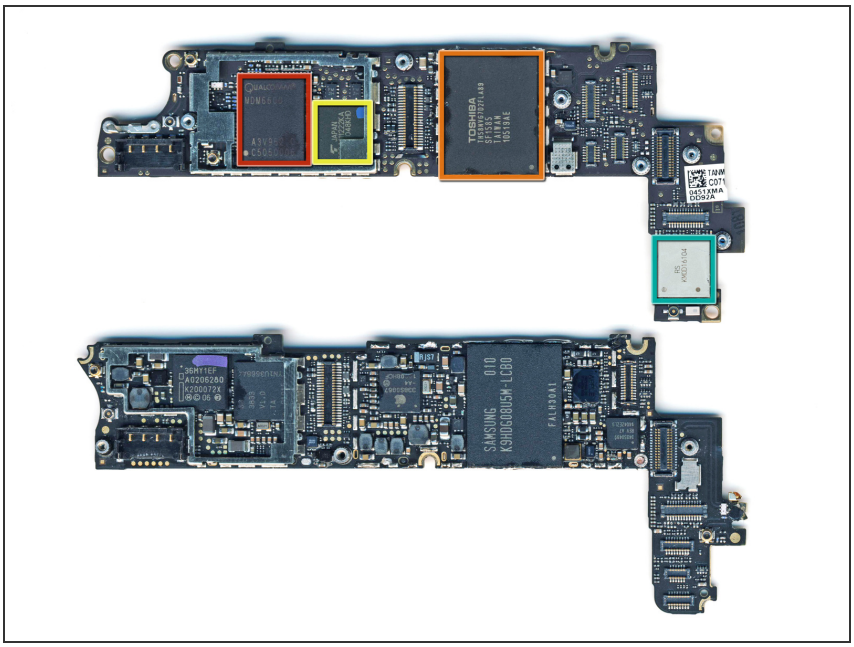
Step 13



Thanks to our friends at UBM Techinsights for providing us with some chip identifications.

- The front side of the Verizon logic board (on top) contains:
  - Apple A4 Processor
  - Qualcomm PM8028 Power Management
  - Dialog D1815A Power Management IC (Apple branded 338S087)
  - 343S0499 - Texas Instruments Touchscreen controller - Apple/TI, part is #343S0499/#F761586G (an up-rev from earlier # F761586C of the iPhone 3GS)
  - SKY77711-4 - Skyworks poweramplifier module for CDMA/PCS
  - SKY77710-4 - Skyworks power amplifier module for dual-mode CDMA/AMPS

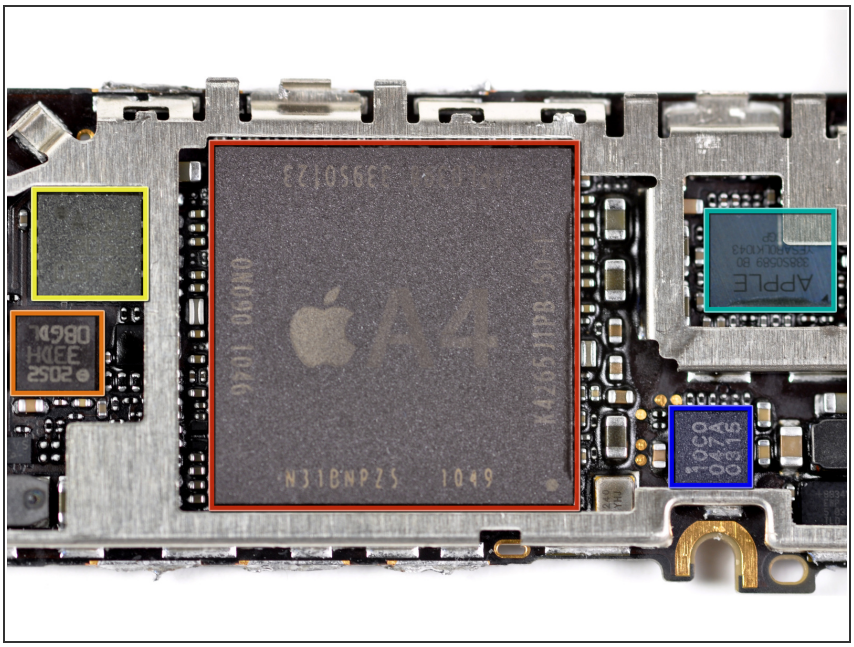
Step 14



- The back side of the Verizon logic board (on top) contains:
  - Qualcomm MDM6600
  - Toshiba TH58NVG7D2FLA89 16 GB NAND Flash
  - Toshiba Y890A111222KA
  - RS KMOD16104 - The logo on this package appears to be that of Murata's. We suspect that this contains the Broadcom BCM4329 that reportedly provides Wi-Fi/Bluetooth connectivity.

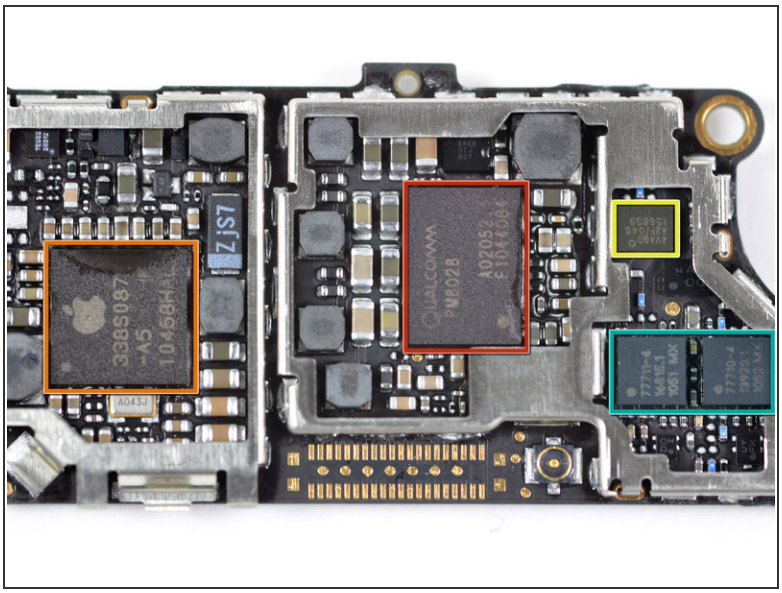
    Adding credibility to this statement is the fact that we found this chip last June in the GSM iPhone 4 and that Murata and Broadcom have had RF partnerships in the past.

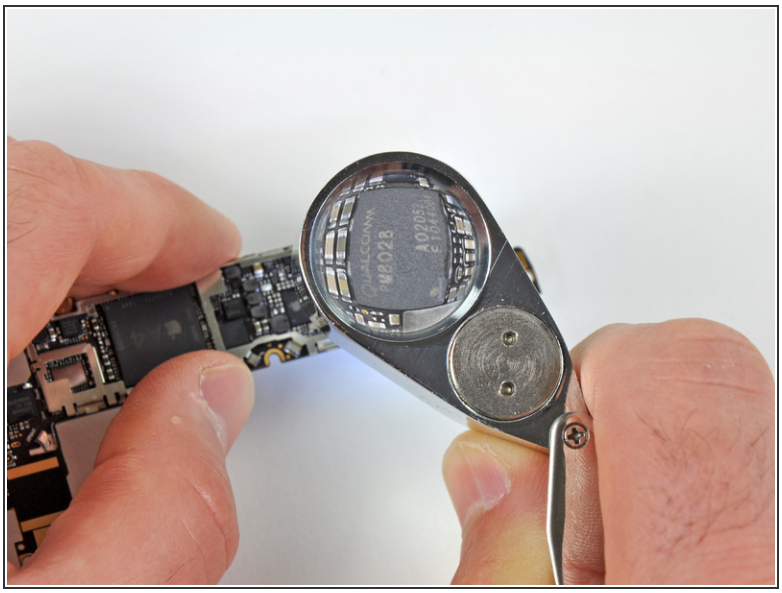
Step 15



- Here are the brains of the iPhone.
- The A4 markings read N31BNPZ5 APL0398 339S0123, front and center.
- ST Micro's 2052 33DH 0BGDL (three-axis accelerometer)
- ST Micro's AGD8 (L3G4200D 3D gyroscope)
- 10C0 047A 0315
- Cirrus Logic 338S0589 CLI1495B0 Audio Codec (Apple branded)

Step 16

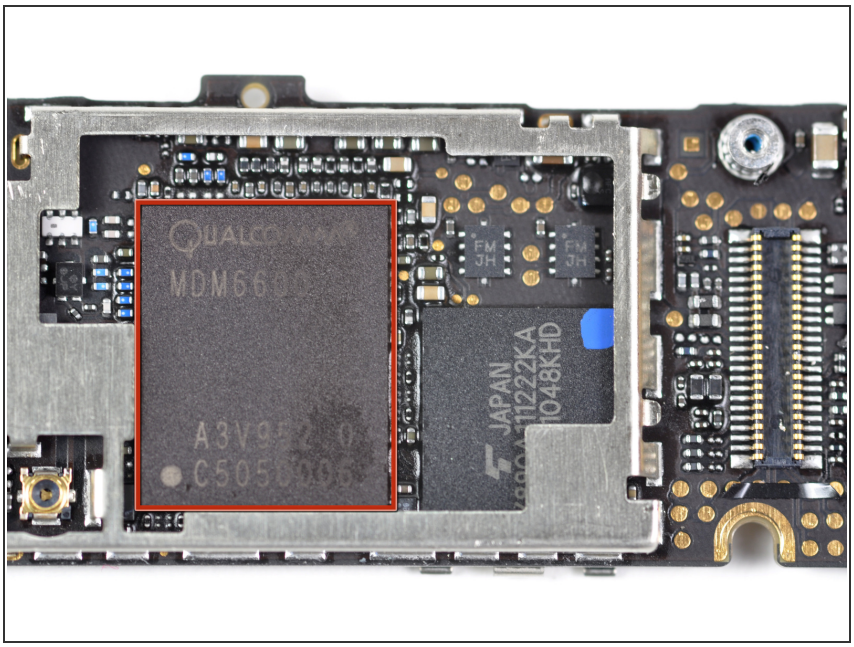




- Like the Apple TV, there is an interesting set of unused solder pads near the edge of the logic board. These are likely used for testing during development.
- The Qualcomm PM8028 chip works in conjunction with the Qualcomm MDM6600 to provide wireless data connection to the phone.
- Dialog D1815A power management IC is in the Apple branded package labeled 338S0876.
- Avago A2FIO46
- Skyworks SKY77711 and SKY77710 power amplifiers

These photos belie how small all these chips are. We'd be lost without the help of a good camera lens and a magnifying loupe.

Step 17



- The Qualcomm MDM6600 chip supports HSPA+ data rates of up to 14.4 Mbps and CDMA2000® 1xEV-DO Rev. A/Rev. B

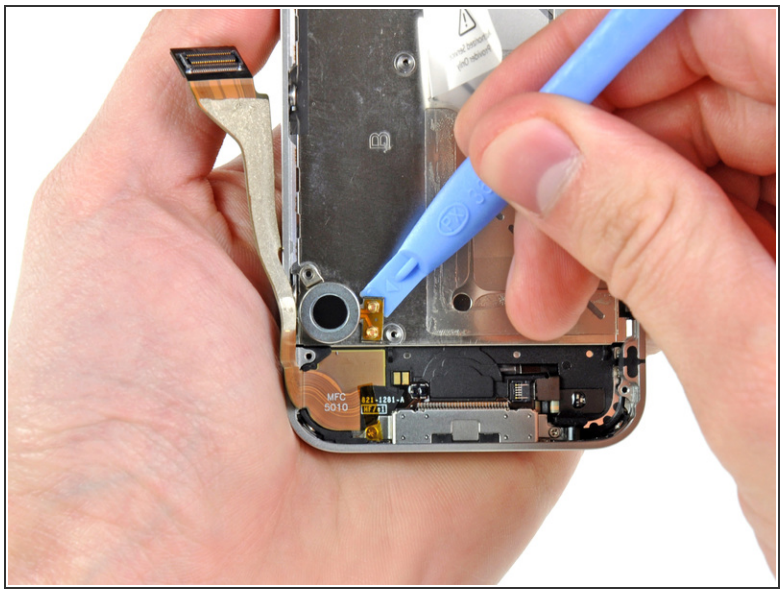
  You can view the datasheet for more information on the chip.

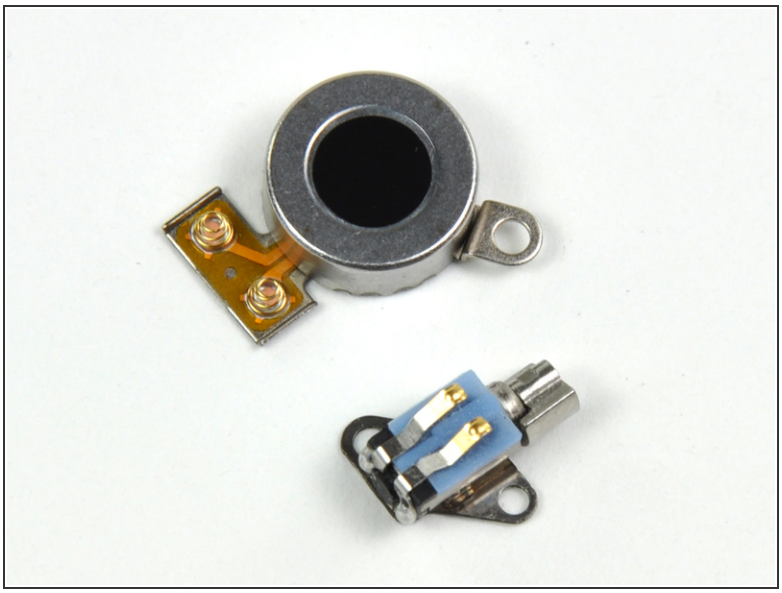
- This is the same chipset as the Droid Pro world phone. It supports both GSM and CDMA—which means that Apple *could* have supported GSM!

- Why didn't they? It may be that it was easier to design antennas for a CDMA-only phone -- this phone supports two cellular frequency bands, while Apple supports five bands in the GSM version.

- Of course, there's no way it could be a real "world phone" without a SIM card slot.

Step 18





- Holy haberdashery, Batman! The iPhone 4's vibrator received a complete makeover.
  - Rather than using a rotational electric motor with a counterweight, the Verizon iPhone appears to utilize a linear oscillating vibrator for call/message alerts. Based on the patent information around this technology, we think this may be a Samsung part.
- Our tests show that the new vibrator has quieter, softer feel, and makes a better sound when on a table.

Step 19

- The display assembly appears to be identical to that of the GSM iPhone 4 at first glance.

  UPDATE: Upon further investigation, the mounting tabs are in drastically different locations for the two display assemblies. This means the two assemblies are definitely **not** interchangeable. The Verizon display is on the left in the second photo.

- We'll have replacement parts and a detailed repair guide posted very soon.

Step 20

- Verizon iPhone 4 Repairability Score: **6 out of 10** (10 is easiest to repair)
  - The iPhone 4 is held together primarily with [lots of] screws, sans tabs, and limited adhesive.
  - The rear panel and battery are both easy to remove and replace (provided you have the right kit and/or correct screwdriver).
  - Apple is using Pentalobe screws to secure the rear panel and keep people out.
  - The LCD and glass are fused together, making repairing a cracked front panel more costly.
  - During disassembly, your finger oils interfere with the iPhone 4's RF grounding contact points, so we recommend you wear gloves while performing any repairs.

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